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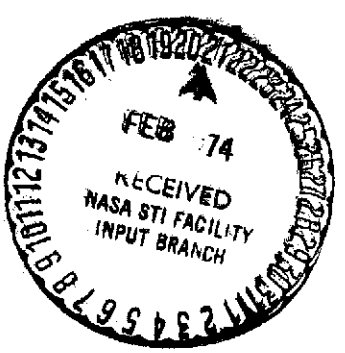

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16. Abstract

Various types of wind power plants in the USSR and in the USA are discussed. The VIME D-12 in Crimea, a large power plant, is described. Uses mentioned for the USA are running farm machinery, protecting pipes from corrosion due to leakage currents, and supplying power to amplifiers for telephone wires.

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AIR POWER PLANTS IN RUSSIA AND THE UNITED STATES
(FROM DIMITRY STEIN, ELEKTRIZITÄTSWIRTSCH, VOL. 40, NO. 16, 1941)

It is little known, but Russia and the United States already /17* have numerous wind power plants. In Russia, it is often difficult to profitably hook up isolated villages to a large distribution network. In that case, a local power plant can be of assistance. The first air power plant was put into operation in the Crimea as long ago as 1931. The propeller and the directly coupled generator pivot in a torpedo-like housing at the top of a lattice mast about 40 m high. The end of the housing opposite the propeller is connected with the ground by an oblique vertical boom. The ground end of the boom has a wheel, which moves on a circular rail around the lattice mast. As soon as the wind changes direction, an electric motor automatically moves the boom, thus adjusting the propeller to the new wind direction. The system develops 90 kW at a wind speed of 8 m/sec. In 1936/37, a new type was brought out which delivers 75 kW at a wind speed of 8 m/sec, and does not require a boom. Another new type (Fig. 1) operates in combination with an accumulator battery. However, the latter is designed for only 11% of the network voltage, and operates in series with the generator. Hence, this is not "charge-discharge operation." Instead, the battery of 200 Ah serves to maintain the network voltage. The propeller of this fully automatic type develops 10 kW at a wind velocity of 8 m/sec. The power is trans- /18 mitted to the dynamo through a gearing at 1450 rpm. With an annual mean wind speed of 5 m/sec, one kWh costs 20 kopeks, at 6 m/sec, 15 kopeks. In comparison, large thermal power plants deliver a kWh for 5 to 6 kopeks. The collapsible air power plant of the Russian 1937 North Pole expedition has become famous. No part could weigh more than 50 kg, and assembly and disassembly

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* Numbers in the margin indicate pagination in the foreign text.

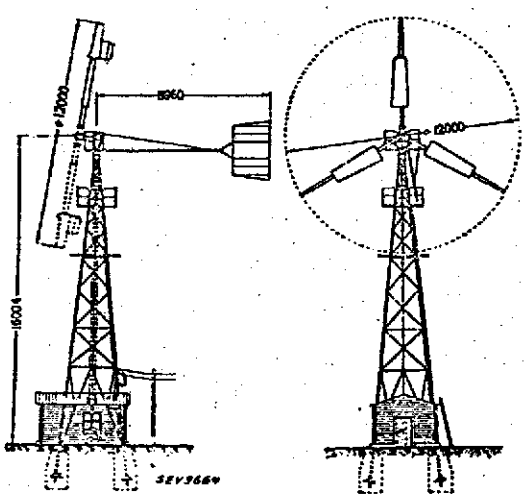

Fig. 1. Wind motor VIME-D 12.

had to be fast. The plant, which developed only 0.3 kW at a wind speed of 8 m/sec, was in operation from May 1937 to February 1938, and traveled several thousand kilometers from the North Pole to Southern Greenland on a drifting ice floe. It provided valuable service as an energy source for illumination in the long polar night and for the radio station.

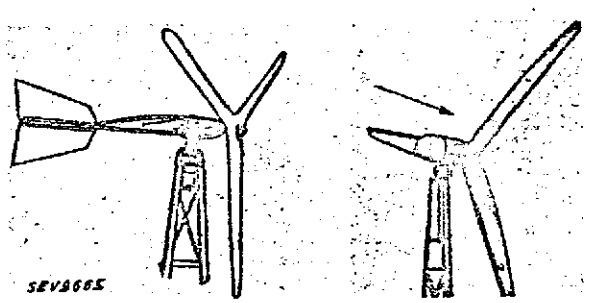

Fig. 2. American wind power plants. Left: "Airlight device, power 1000 W; right: "Super Monarch Deluxe" device, power 3500 W.

In the United States, the situation is quite different. There the small air power plants fill the individual requirements of the many farms far from population centers. One single firm in this country has already delivered more than 500,000 such plants (usually of 200 W at 6 V). The power is used for milk separators, milking machines, butter machines, and other machinery. There are also small power plants which can be mounted on an automobile or a truck, and can then supply power for the starter, the headlights, the horn, the turn signals, and the radio. Charging begins at a vehicle speed of 35 km/hr. The charging current reaches its maximum at 72 km/hr. Further increases in speed have no effect on the energy budget.

Wind power plants of low power also are used in the United states to protect long pipes against corrosion due to leakage

currents, which are known to attack metals. This so-called electrolytic corrosion ceases if the direction of the current is changed by externally applying a small voltage, making the pipe a cathode and protecting it from corrosion with the resulting oxide layer. Wind power plants are also used to feed amplifier devices for telephone lines originating on the Pacific Coast which must pass through desert regions. Here too, the feeding is done through accumulators. When the accumulators are drained due to a long lull in the wind, a small gasoline-motor arrangement automatically goes into operation as a reserve. If this resource should fail, a relay automatically sends a signal to the nearest locality.

Editorial Remark: The Wirtschaftsgruppe Electrizitatsversorgung [Electricity Supply Business Group] in Berlin published a technical report in August 1941 on "Wind power plants in the USSR." It contains numerous interesting details of technical and economic nature on such power plants.